Close stellar encounters with the Oort cloud based on HIPPARCOS data.

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We have combined HIPPARCOS proper motion and parallax data for nearby stars with ground-based radial velocity measurements to find stars which may have passed (or will pass) close enough to the Sun to disrupt the Oort cloud. Such close encounters could deflect large numbers of comets into the inner solar system, with possibly serious consequences for biological evolution. From the data analyzed to date, we find the number N of close stellar approaches within a distance r from the Sun (measured in parsecs) is given by $N \approx 5\,r^2\mathrm{Myr}^{-1}$, in good agreement with previously predicted values. Only one star (Gliese 710) is found with a predicted closest distance of less than 0.5 parsecs, although several stars come within about 1 parsec during a +/- 8.5 Myr interval. In most cases the uncertainty in closest approach distance is dominated either by uncertainties in published radial velocity measurements or by uncertainties in the barycentric motion of binary systems. We have started a program to obtain new radial velocities for stars in our sample with no previously published values.